CLAIMS

1. A telescope system of the type commonly used to observe/photograph celestial objects, the telescope system comprising:

a telescope;

a tripod supporting the telescope;

a mount attaching the telescope to the tripod so as to facilitate rotation of the telescope about two generally orthogonal axes;

at least one controller/motor assembly, each controller/motor assembly comprising:

an electric motor coupled to move the telescope about one of the two generally orthogonal axes;

a control circuit coupled to drive the motor;

an encoder coupled to provide feedback from the motor to the control circuit to facilitate enhanced position control of the telescope; and

wherein the control circuit is configured to cooperate with the encoder to cause the motor to position the telescope as desired, so as to facilitate enhanced location and tracking of celestial objects.

2. The telescope system according to claim 1, wherein the motor comprises a DC motor.

3. The telescope system according to claim 1, wherein the control circuit comprises a microcontroller.

4. The telescope system according to claim 1, wherein the control circuit comprises a PIC 16C54 microcontroller.

5. The telescope system according to claim 1, wherein the control circuit comprises a microprocessor.

6. The telescope system according to claim 1, wherein the encoder comprises an optical encoder.

7. The telescope system according to claim 1, wherein the encoder comprises an encoder wheel.

8. The telescope system according to claim 1, wherein the encoder comprises an encoder wheel positioned upon a shaft of the motor.

9. The telescope system according to claim 1, wherein the encoder comprises:

an encoder wheel positioned upon a shaft of the motor;

an LED directing light toward the encoder wheel; and

a pair of photodiodes receiving light from the encoder, such that the light is modulated so as to be representative a of speed of the motor.

10. The telescope system according to claim 1, wherein the control circuit is configured to control a speed at which the telescope moves to facilitate tracking of a celestial object being viewed/photographed.

11. The telescope system according to claim 1, wherein the control circuit is configured to reduce a speed at which a telescope is being moved as the telescope nears a desired position thereof, so as to mitigate overshoot of the telescope.

12. The telescope system according to claim 1, wherein the control circuit is configured to receive a signal representative

of an angle by which the telescope is to be moved and is configured to cause the telescope to move by approximately that angle.

13. The telescope system according to claim 1, wherein the control circuit is configured to store a present position of the telescope, receive a desired new position of the telescope, calculate a difference between the present position of the telescope and the desired new position of the telescope, and cause the telescope to move by approximately the calculated difference.

14. A controller/motor assembly for a telescope of the type commonly used to observe/photograph celestial objects, the controller/motor assembly comprising:

an electric motor coupled to move the telescope about one of two generally orthogonal axes;

a control circuit coupled to drive the motor;

an encoder coupled provide feedback from the motor to the control circuit to facilitate enhanced position control of the telescope; and

wherein the control circuit is configured to cooperate with the encoder to cause the motor to position the telescope as desired, so as to facilitate enhanced location and tracking of celestial objects.

15. The controller/motor assembly according to claim 14, wherein the motor comprises a DC motor.

16. The controller/motor assembly according to claim 14, wherein the control circuit comprises a microcontroller.

17. The controller/motor assembly according to claim 14, wherein the control circuit comprises a PIC 16C54 microcontroller.

18. The controller/motor assembly according to claim 14, wherein the control circuit comprises a microprocessor.

19. The controller/motor assembly according to claim 14, wherein the encoder comprises an optical encoder.

20. The controller/motor assembly according to claim 14, wherein the encoder comprises an encoder wheel.

21. The controller/motor assembly according to claim 14, wherein the encoder comprises an encoder wheel positioned upon a shaft of the motor.

22. The controller/motor assembly according to claim 14, wherein the encoder comprises:

an encoder wheel positioned upon a shaft of the motor;

an LED directing light toward the encoder wheel; and

a pair of photo diodes receiving light from the encoder, such that the light is modulated so as to be representative a of speed of the motor.

23. The controller/motor assembly according to claim 14, wherein the control circuit is configured to control a speed at which the telescope moves to facilitate tracking of a celestial object being viewed/photographed.

24. The controller/motor assembly according to claim 14, wherein the control circuit is configured to reduce a speed at

which a telescope is being moved as the telescope nears a desired position thereof, so as to mitigate overshoot of the telescope.

25. The controller/motor assembly according to claim 14, wherein the control circuit is configured to receive a signal representative of an angle by which the telescope is to be moved and is configured to cause the telescope to move by approximately that angle.

26. The controller/motor assembly according to claim 14, wherein the control circuit is configured to store a present position of the telescope, receive a desired new position of the telescope, calculate a difference between the present position of the telescope and the desired new position of the telescope, and cause the telescope to move by approximately the calculated difference.

27. A telescope system of the type commonly used to observe/photograph celestial objects, the telescope system comprising:

a telescope;

a tripod supporting the telescope;

a mount attaching the telescope to the tripod;

at least one controller/motor assembly for moving the telescope with respect to the tripod, each controller/motor assembly comprising:

an electric motor;

a control circuit coupled to drive the electric motor;

a light source;

a plurality of light sensors receiving light from the light source;

an encoder wheel alternately permitting light to travel from the light source to the light sensors and preventing light

from traveling from the light source to the light sensors, movement of the encoder wheel being representative of movement of the drive motor; and

wherein the light sensors are coupled to provide a signal to the control circuit which is representative of movement of the electric motor to facilitate servo control of the electric motor.

28. The telescope system as recited in claim 27, wherein the light source comprises a light emitting diode (LED).

29. The telescope system as recited in claim 27, wherein the plurality of light sensors comprise two light sensors.

30. The telescope system as recited in claim 27, wherein the plurality of light sensors comprise two light sensors configured to operate in quadrature.

31. The telescope system as recited in claim 27, wherein the plurality of light sensors comprise photodiodes.

32. The telescope system as recited in claim 27, wherein the encoder wheel comprises a plurality of spokes extending radially so as to alternately permit light to travel from the light source to the light sensors and prevent light from traveling from the light source to the light sensors.

33. The telescope system as recited in claim 27, wherein the electric motor comprises a DC motor.

34. A controller/motor assembly for moving a telescope of the type commonly used to observe/photograph celestial objects, the controller/motor assembly comprising:

an electric motor;

a control circuit coupled to drive the electric motor;

a light source;

a plurality of light sensors receiving light from the light source;

an encoder wheel alternately permitting light to travel from the light source to the light sensors and preventing light from traveling from the light source to the light sensors, movement of the encoder wheel being representative of movement of the drive motor; and

wherein the light sensors are coupled to provide a signal to the control circuit which is representative of movement of the electric motor to facilitate servo control of the electric motor.

35. The controller/motor assembly as recited in claim 34, wherein the light source comprises a light emitting diode (LED).

36. The controller/motor assembly as recited in claim 34, wherein the plurality of light sensors comprise two light sensors.

37. The controller/motor assembly as recited in claim 34, wherein the plurality of light sensors comprise two light sensors configured to operate in quadrature.

38. The controller/motor assembly as recited in claim 34, wherein the plurality of light sensors comprise photo diodes.

39. The controller/motor assembly as recited in claim 34, wherein the encoder wheel comprises a plurality of spokes extending radially so as to alternately permit light to travel

from the light source to the light sensors and prevent light from traveling from the light source to the light sensors.

40. The controller/motor assembly as recited in claim 34, wherein the electric motor comprises a DC motor.

41. A telescope system of the type commonly used to observe/photograph celestial objects, the telescope system comprising:

a telescope;

a tripod supporting the telescope;

a mount attaching the telescope to the tripod;

at least one controller/motor assembly for moving the telescope with respect to the tripod, each controller/motor assembly comprising:

an electric motor;

a control circuit coupled to drive the electric motor;

a light source;

at least one light sensor receiving light from the light source;

an encoder wheel alternately permitting light to travel from the light source to the light sensor(s) and preventing light from traveling from the light source to the light sensor(s), movement of the encoder wheel being representative of movement of the drive motor;

a calibration circuit coupled to the control circuit and to the light source to set a brightness of the light source to a desired level; and

wherein the light sensor(s) are coupled to provide a signal to the control circuit which is representative of a movement of the electric motor to facilitate servo control of the electric motor.

42. The telescope system as recited in claim 41, wherein the calibration circuit comprises a plurality of current limiting resistors selectively switchable into series with the light source to vary a current through the light source.

43. The telescope system as recited in claim 42, wherein the control circuit is configured to determine a brightness of the light source.

44. A controller/motor assembly for a telescope of the type commonly used to observe/photograph celestial objects, the controller/motor assembly comprising:

an electric motor;

a control circuit coupled to drive the electric motor;

a light source;

at least one light sensor receiving light from the light source;

an encoder wheel alternately permitting light to travel from the light source to the light sensor(s) and preventing light from traveling from the light source to the light sensor(s), movement of the encoder wheel being representative of movement of the drive motor;

a calibration circuit coupled to the control circuit and to the light source to set a brightness of the light source to a desired level; and

wherein the light sensor(s) are coupled to provide a signal to the control circuit which is representative of movement of the electric motor to facilitate servo control of the electric motor.

45. The controller/motor assembly as recited in claim 44, wherein the calibration circuit comprises a plurality of current

limiting resistors selectively switchable into series with the light source to vary a current through the light source.

46. The controller/motor assembly as recited in claim 45, wherein the control circuit is configured to determine a brightness of the light source.

47. A telescope system of the type commonly used to observe/photograph celestial objects, the telescope system comprising:

a telescope;

a tripod supporting the telescope;

a motorized mount attaching the telescope to the tripod for positioning the telescope, the motorized mount comprising:

a base fixedly attached to the tripod;

a fork pivotally attached to the base via a fork pivot to facilitate movement of the telescope in azimuth, the telescope being pivotally attached to the fork to facilitate movement of the telescope in altitude;

an azimuth motor attached to the base and coupled to rotate the fork;

an altitude motor attached to the fork and coupled to rotate the telescope;

a cable extending from the base to the altitude motor for providing electrical communication to the altitude motor;

a base stop formed to the base;

a fork stop formed to the fork;

an intermediate stop configured to rotate independently of the base and the fork; and

wherein the fork stop abuts the intermediate stop and the intermediate stop abuts the base stop when the fork is rotated less that two revolutions with respect to the base, to limit wrapping of the cable around the fork pivot.

48. The telescope system as recited in claim 47, wherein the fork stop comprises a post formed upon the fork and extending downwardly therefrom, and the base stop comprises a post formed to the base and extending upwardly therefrom.

49. The telescope system as recited in claim 47, wherein the intermediate stop is configured to pivot about the fork pivot.

50. The telescope system as recited in claim 47, wherein the intermediate stop comprises a lever pivotally attached to the fork pivot.

51. A motorized mount for attaching a telescope of the type commonly used to observe/photograph celestial objects to a tripod for positioning the telescope, the motorized mount comprising:

a base fixedly attachable to a tripod;

a fork pivotally attached to the base via a fork pivot to facilitate movement of the telescope in azimuth, the telescope being pivotally attached to the fork to facilitate movement of the telescope in altitude;

an azimuth motor attached to the base and coupled to rotate the fork;

an altitude motor attached to the fork and coupled to rotate the telescope;

a cable extending from the base to the altitude motor for providing electrical communication to the altitude motor;

a base stop formed to the base;

a fork stop formed to the fork;

an intermediate stop configured to rotate independently of the base and the fork; and

wherein the fork stop abuts the intermediate stop and the intermediate stop abuts the base stop when the fork is

rotated less that two revolutions with respect to the base, to limit wrapping of the cable around the fork pivot.

52. The motorized mount as recited in claim 51, wherein the fork stop comprises a post formed upon the fork and extending downwardly therefrom, and the base stop comprises a post formed to the base and extending upwardly therefrom.

53. The motorized mount as recited in claim 51, wherein the intermediate stop is configured to pivot about the fork pivot.

54. The motorized mount as recited in claim 51, wherein the intermediate stop comprises a lever pivotally attached to the fork pivot.

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